



## Open Source Software

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For more information regarding how to access software from Los Alamos, contact the [Software Team](#).

- [Branchless Reproducible Floating Point Summation With Integers, Version 1.x.x](#) Returns bitwise identical sums regardless of the order of the summands. Uses no branches and mostly integer operations. Designed to be vectorizeable.
- [brulilo, Version 0.x](#) brulilo is a Python package for building and evolving thermonuclear reaction networks.
- [Byfl: Compiler-based Application Analysis](#) Byfl is a productivity tool that helps computational scientists analyze their code for accelerator-friendly and accelerator-unfriendly constructs.
- [Clog, Version 1.0, C17026](#) Clog is a library of charged particle stopping powers and related Coulomb logarithm processes in a plasma. The stopping power is a particularly useful quantity for plasma physics, as it measures the energy loss of per unit length of charged particle as it traverses a plasma. Clog's primary stopping power is the BPS (Brown-Preston-Singleton) theory.
- [CLAMR \(Compute Language Adaptive Mesh Refinement\)](#) CLAMR is being developed as a DOE mini-app, one of several applications being developed to help prepare for the Exascale class of heterogeneous hardware platforms.
- [CODY: Continuum Dynamics Evaluation and Test Suite](#) CODY is a development framework and suite of small applications, or "mini-apps", characteristic of continuum dynamics applications that will be used for research in new programming models, software environments, and the evaluation of new computer architectures.
- [coNCePTuaL -- A Network Correctness and Performance Testing Language](#) coNCePTuaL is a tool designed to facilitate rapidly generating programs that measure the performance and/or test the correctness of networks and network protocol layers
- [Contact Control, Version 1.0](#) The contact control code is a generalized force control scheme meant to interface with a robotic arm being controlled using the Robot Operating System (ROS).
- [db, Version 0.2.x](#) A set of programs and utilities for generating and manipulating data files in TSV (tab-separated value) or JSON format.
- [DeCE Version 1.2](#) DeCE is a nuclear reaction database manipulation program, particularly for the data written in the ENDF (Evaluated Nuclear Data File) format.
- [Draco, Version 6.x.x](#)
- Draco is an object-oriented component library geared towards numerically intensive, radiation (particle) transport applications built for parallel computing hardware.
- [Flexible Computer Science Infrastructure \(FleCSI\), Version 1.0](#) A flexible computer science infrastructure tool for developing multi-physics application codes.

- [Genome Majority Vote](#) The pipeline runs PRODIGAL gene predictions on all genomes, runs pan-reciprocal BLAST, and identifies ortholog sets.
- [GPU Life, C16122](#) The code runs the Game of Life among several processors. Each processor uses CUDA to set up the grid's buffer on the GPU, and that buffer is fed to other GPU languages to apply the rules of the game of life.
- [Gridder, Version, 3](#) GRIDDER is a simple interactive grid generation tool for creating orthogonal, 2D quadrilateral or 3D hexahedral grids.
- [HASH v.1.x](#) Described in the journal article and presentations, "Hash-Based Algorithms for Discretized Data," hash algorithms are to be distributed for starting points for optimization efforts.
- [HASH v.2.x](#) Enhancements to hash version 1.x, with compact hash techniques and described in the journal article, "Compact Hash Algorithms for Computational Meshes."
- [HILO: Quasi Diffusion Accelerated Monte Carlo on Hybrid Architectures](#) The Boltzmann transport equation provides high fidelity simulation of a diverse range of kinetic systems. We present a novel algorithm, Quasi-Diffusion Accelerated Monte Carlo (QDA-MC), which improves performance on heterogeneous CPU/GPU architectures.
- [Kokkos Clang, Version 1.0](#) A Clang-based compiler for compiling Kokkos code (with no syntactical differences) with the aim of generating optimized code for parallel targets such as multithreaded and GPU (NVIDIA/CUDA) and preserving domain awareness.
- [LaGriT V3.x](#) Los Alamos Grid Toolbox (LaGriT) is a library of user callable tools that provide mesh generation, mesh optimization and dynamic mesh maintenance in two and three dimensions.
- [LANL Go Suite](#) The LANL Go Suite is a collection of packages, libraries, utilities, and software patches related to Google's Go programming language. The LANL Go Suite largely takes a high-performance computing angle to Go.
- [Libparty, Version 1.x](#) General particle library designed to run on next-generation hardware such as MICs and GPUs
- [Mads.jl](#) Mads.jl (Model analysis and decision support in Julia) is a code that streamlines the process of using data and models for analysis and decision support. It is based on another open-source code developed at Los Alamos National Laboratory and written in C/C++.
- [MADSPython 1.x](#) MADSPython (Model analysis and decision support tools in Python) is a code in Python that streamlines the process of using data and models for analysis and decision support using the code MADS.
- [Model Analysis ToolKit \(MATK\), Version 0](#) MATK provides basic functionality to facilitate model analysis within the Python computational environment.
- [MC3, Version 1](#) The MC3 code is used to perform Monte Carlo simulations in the isothermal-isobaric ensemble (constant number of particles, temperature, and pressure) on molecular crystals.
- [McPhD](#) McPhD is a research code designed to explore the applications of the Haskell programming language to Monte Carlo algorithms.
- [MeGAMerge, Version 1.0](#) A novel method of merging of multiple genomic assembly or long read data sources for assembly.
- [mFUSE: Function Sequencer for MATLAB, Version 0.1.00](#) mFUSE: Function Sequencer for MATLAB is a Java based graphical user interface for use with MATLAB.
- [Multi-Dimensional Hashed Indexed Metadata \(MDHIM\) System](#) The MDHIM software is a revolutionary new software tool that performs more than a billion key/value inserts per second into a globally ordered key space.
- [Multi Infrastructure Control and Optimization Toolkit, Resilient Design Module \(MICOT-RDT\), Version 2.X](#) MICOT is a tool for optimizing and controlling infrastructure systems. In

includes modules for optimizing the operations of an infrastructure structure (for example optimal dispatch), designing infrastructure systems, restoring infrastructures systems, resiliency, preparing for natural disasters, interdicting networks, state estimation, sensor placement, and simulation of infrastructure systems.

- [NJOY2016, Version x, C16120](#) NJOY2016 is used to convert evaluations in the Evaluated Nuclear Data Files (ENDF) format into forms useful for practical applications such as fission and fusion reactor analysis, criticality safety, radiation shielding, nuclear waste management, nuclear medicine procedures, and more.
- [NuT](#) NuT is a Monte Carlo neutrino transport code for astrophysics simulations.
- [NuFlood, Version 1.x](#) NUFLOOD Version 1.x is a surface-water hydrodynamic package designed for the simulation of overland flow of fluids.
- [OpenSHMEM, C16077](#) OpenSHMEM is an effort to create a specification for a standardized API for parallel programming in the Partitioned Global Address Space.
- [PathScan for Splunk](#) A Splunk App designed to parse and tabulate PathScan data
- [PENNANT](#) PENNANT is a mini-app intended for use in advanced architecture research.
- [PISTON \(Portable Data Parallel Visualization and Analysis\)](#) A Portable Cross-Platform Data-Parallel Visualization and Analysis Library
- [POSTMAX, Version 2.0](#) POSTMAX is a small program developed to statistically analyze MACCS2 output to determine a 95th percentile value for atmospheric dispersion ( $x/Q$ ) as a function of weather data and site boundary distance.
- [Progress Version 1.0](#) Software library for parallel rapid order N and graph-based recursive electronic structure solvers with applications to material science, chemistry, and molecular biology.
- [PROSIG, Version 1.x](#) PROSIG designs nucleic acid-based assays that detect specified target sequences and do not detect specific non-target sequences.
- [PyFEHM](#) PyFEHM is a set of Python libraries designed to be used with the LANL simulation code FEHM.
- [PyGeoTess 0.2.0](#) PyGeoTess is a Python interface module to the GeoTess gridding and earth model library from Sandia National Laboratories. It provides simplified access to a subset of the GeoTess C++ library, and takes advantage of Python's interactive interpreter and inline documentation system.
- [PyVXI-11, Version 1.0](#) PyVXI-11 is a Python extension to interface with electronics laboratory equipment such as oscilloscopes, network and spectrum analyzers, multimeters, etc., using the standard SCPI language and TCP/IP.
- [Quinoa](#) Quinoa is a set of computational tools that enables research and numerical analysis in fluid dynamics. At this time it is a test-bed to experiment with various algorithms using fully asynchronous runtime systems.
- [ramdisk, Version 0.x](#) The intent of the software is eventually to become a middleware library to provide a cross platform interface for creating and managing a ramdisk.
- [Response Surface Modeling Tool Suite, Version 1.x](#) The Response Surface Modeling (RSM) Tool Suite is a collection of three codes used to generate an empirical interpolation function for a collection of drag coefficient calculations computed with Test Particle Monte Carlo (TPMC) simulations.
- [Retro-Future, 1.0](#) A system for processing network packet capture streams, extracting metadata and generating flow records (via Argus.)
- [ROSSTEP, Version 1.3](#) ROSSTEP is a system for sequentially running roslaunch, rosnod, and bash scripts automatically, for use in Robot Operating System (ROS) applications.

- [Sandal, Version 0.1, C16081](#) Sandal is a mini-app of particle-mesh based simulation in terms of relational tables and queries. The physics simulated is rather simple, it propagates a set of particles in a constant, 2D wind field with Gaussian turbulence.
- [Seismoacoustic Software](#) Addressing local and regional-scale seismological and infrasound problems through a combination of theory, data analysis and field deployments in support of United States treaty/explosion monitoring.
- [SHMTools](#) SHMTools is a MATLAB package that facilitates the construction of structural health monitoring (SHM) processes.
- [ShiftNMFk 1.1](#) The code represents an unsupervised adaptive machine learning algorithm that allows efficient and high performance de-mixing and feature extraction of a multitude of non-negative signals mixed and recorded by a network of uncorrelated sensor arrays.
- [SNAP:SN \(Discrete Ordinates\) Application Proxy](#) SNAP serves as a proxy application to model the performance of a modern discrete ordinates neutral particle transport application.
- [Spherical nanoindentation stress-strain analysis \(Spin\), Version 1.0](#) Nanoindentation is a tool that allows the mechanical response of a variety of materials at the nano micron length scale to be measured.
- [STONIX, Version 0.x](#) STONIX is a program for configuring UNIX and Linux computer operating systems.
- [ThermonucleotideBLAST](#) ThermonucleotideBLAST is a software program for searching a target database of nucleic acid sequences using an assay specific query.
- [tsk\\_get\\_files](#) tsk\_get\_files is a script that uses "The Sleuth Kit" commands "fls" and "icat" to rebuild a file structure from a disk image.
- [Topness, Version 1.0](#) The code would be used in analyses of data from the LHC, to improve the sensitivity of their experiments to new exotic particles. The software minimizes a certain function, as defined in the above reference, for some input provided by the user. The output to the user is the global minimum of that function. The code finds the global minimum using the Nelder-Mead algorithm. All the codes for the minimization including the Nelder-Mead algorithm, is written by the author. The software is written in C++.
- [Total-Variation Regularized Numerical Differentiation \(TVDiff\), Version 1.0](#) This code computes the derivative of a function specified by noisy data using regularization to suppress noise amplification.
- [Tusas, Version 1, C17003](#) Tusas is a general / flexible software framework for solving coupled systems of nonlinear partial differential equations. Tusas was originally developed for phase-field simulation of solidification. In order for Tusas to be effective, the PDEs must be compatible with structured or unstructured Lagrange (nodal) finite element discretizations and explicit (Euler) or implicit (Euler, Trapezoid, BDF2) temporal discretizations.
- [Two Sample T-Test for Comparing Genetic Sequence Diversity](#) Given two samples of sequences the program performs a t-test to see whether the two mean genetic distances are significantly different.
- [Tycho 2, Version 0.1](#) This software implements the discrete ordinates method for kinetic transport equations. Specifically, it implements sweeps over an unstructured mesh. The purpose is to have a small, malleable code as a test bed for new numerical and computational optimization techniques.
- [ZEM, Version 1.x](#) Typically environmental management problems require analysis of large and complex data sets originating from concurrent data streams with different data collection frequencies and pedigree.

- [Zenoss](#) The HPC monitoring project goal was to extend upon the Zenoss core produce to provide large scale system monitoring, data collection and reporting, and root cause isolation for high-performance computers and isolated infrastructure.
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